

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000515820010-9

GOLOVINTIKOV, P. P.

"BESM" Part III, Publ. House of the Acad. Sci. USSR, 1952

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CIA-RDP86-00513R000515820010-9"

GOLOVISTIKOV, P. P. (Engineer)

"Circuits Based on Dynamic Triggers" a paper presented at the Conference on Methods  
of Development of Soviet Mathematical Machine-Building and Instrument-Building,  
12-17 March 1956.

Translation No. 596, 8 Oct 56

and D499674

GOLOVISTIKOV, PP

PHASE I BOOK EXPLOITATION 711

Akademiya nauk SSSR. Institut tochnoy mehaniki i vychislitel'noy tekhniki Vychislitel'naya tekhnika (Computer Engineering) Moscow, Izd-vo AN SSSR, 1958. 150 p. 4,500 copies printed.

Responsible Ed.: Lebedev, S. A., Academician; Ed. of Publishing House: Grigor'yev, Ye. N.; Tech. Ed.: Prusakova, T. A.

PURPOSE: This book is intended for specialists engaged in the design and use of electronic computers.

COVERAGE: A number of problems of computer engineering is discussed in this collection of articles. The power supply system of high-speed electronic computers of the USSR Academy of Sciences, new computer components and devices, and methods of controlling arithmetic units are covered in this publication. Methods of selecting the necessary word from the mechanical dictionary in machine translation and the terminology of modern computing machines are also presented. For references see Table of Contents.

TABLE OF CONTENTS:

From the Editor

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Computer Engineering

711

Shekerbakov, O. K. Power Supply System of the High-Speed Electronic Computer of the USSR Academy of Sciences

5

This article represents a summary of a three-year period (1952-1955) of observing the operation of power-supply equipment for the high-speed electronic computer of the USSR Academy of Sciences. The results of a number of experiments conducted during that period are given and the improvements which may be applied in future projects are discussed. No personalites are mentioned.

Mayorov, F. V. Digital Differential Analyzers

21

A description of the construction and operation of various components of digital differential analyzers is given. Methods of solving different problems on the analyzer are also presented. It is stated that the described analyzer was developed in the USA in 1950. There are 22 references, of which 1 is Soviet and 21 English.

Golovistikov, P. P. Dynamic Triggers and Their Use in Parallel-action Computers

82

Various types of dynamic triggers such as those used in shift circuits, memory capacitor triggers, and delayed-line triggers of computers are discussed in this article. Pulse code inversion and addition, pulse-shift operation, and pulse decoder operation are also presented. The article

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G. O. L u v i s i , k . u , t . p .

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PHASE I BOOK EXPLOITATION SOV/2675

Moscow. Dom nauchno-tehnicheskoy propagandy im. F. E. Dzerzhinskogo

Vychislitel'naya tekhnika i yeye primeneniye (Computation Technique and Its Application) Moscow, Gosenergoizdat, 1959. 391 p. (Series: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znanii RSFSR) 5,000 copies printed.

Ed. (Title page): S. A. Lebedev, Academician; Ed. (Inside book): V.I. Savel'yev;  
Tech. Ed.: G. I. Matvayev.

PURPOSE: This collection of articles is intended for scientific, engineering and technical personnel engaged in research, design and operation of digital and analog computers. It may also be used by students of vuzes specializing in computers.

COVERAGE: The authors present fundamentals of digital computers, their elements and units such as arithmetic units, internal and external memory and control devices. They discuss the possibility of constructing computers using semiconductor elements and consider the fundamentals in the theory of logical circuits. They also discuss problems of programming and explain the operation of analog computers and their elements. Brief discussion of mathematical instruments is also presented. The articles were presented at a computer semi-

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Computation Technique (Cont.)

SOV/2675

nar arranged by Moskovskiy dom nauchno-tehnicheskoy propagandy imeni F. E. Dzerzhinskiiy (Moscow Center for Scientific and Technical Propaganda imeni F. D. Dzerzhinskiiy) in 1957. No personalities are mentioned. References appear at the end of some articles.

## TABLE OF CONTENTS:

Foreword	3
Lebedev, S. A., Academician. Electronic Digital Computers The author presents a general discussion of electronic digital computers. He describes their operation and areas of application and considers prospects for further development. There are no references.	5
Artamonov, G. T., Engineer. Problem Programming and Reducing Mathematical Operations to a Form Suitable for Digital Computers The author discusses methods of representing numbers in computers and performing arithmetical, logical and control operations. He also presents an example of solving a complex problem and presents methods of checking computer accuracy. There are 2 references, both Soviet.	17

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## Computation Techniques (Cont.)

SOV/2675

Alekseyev, V. Ya. Circuit Component Elements of High-speed Computers 51

The author discusses the principle of operation of basic elements and circuits of binary-system computers. He describes the operation of trigger circuits, coincidence and noncoincidence circuits and gate circuits. There are 9 references: 5 Soviet and 4 English.

Golovistikov, P. P., Candidate of Technical Sciences. Arithmetic Units of Universal High-speed Computers 67

The author discusses basic types of arithmetic units and the function they perform. He presents a block diagram of a universal arithmetic unit and describes circuits for receiving, sending and shifting codes. He also discusses adding and multiplying circuits. There are 7 references, all Soviet (including 1 translation).

Mel'nikov, V. A., Engineer. Control Devices of Universal High-speed Computers 87

The author discusses the principle of operation computer control devices and describes the control panel. He also explains methods of checking computer performance. There is 1 Soviet references.

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etc.

PHASE I BOOK EXPLOITATION

SOV/4162

Golovistikov, Petr Petrovich, Aleksey Nikolayevich Zimarev, and Kirill  
Sergeyevich Naslukhovskiy

Arifmeticheskoye ustroystvo i ustroystvo upravleniya BESM (Arithmetical and Control  
Units of the BESM / High-Speed Electronic Computer/). Moscow, Fizmatgiz, 1960.  
244 p. (Series: Elektronnaya tsifrovaya vychislitel'naya mashina BESM, 2)  
15,000 copies printed.

Ed. (Title page): S.A. Lebedev, Academician; Ed. (Inside book): Yu. M. Bezborodov;  
Tech. Ed.: S.N. Akhlaamov.

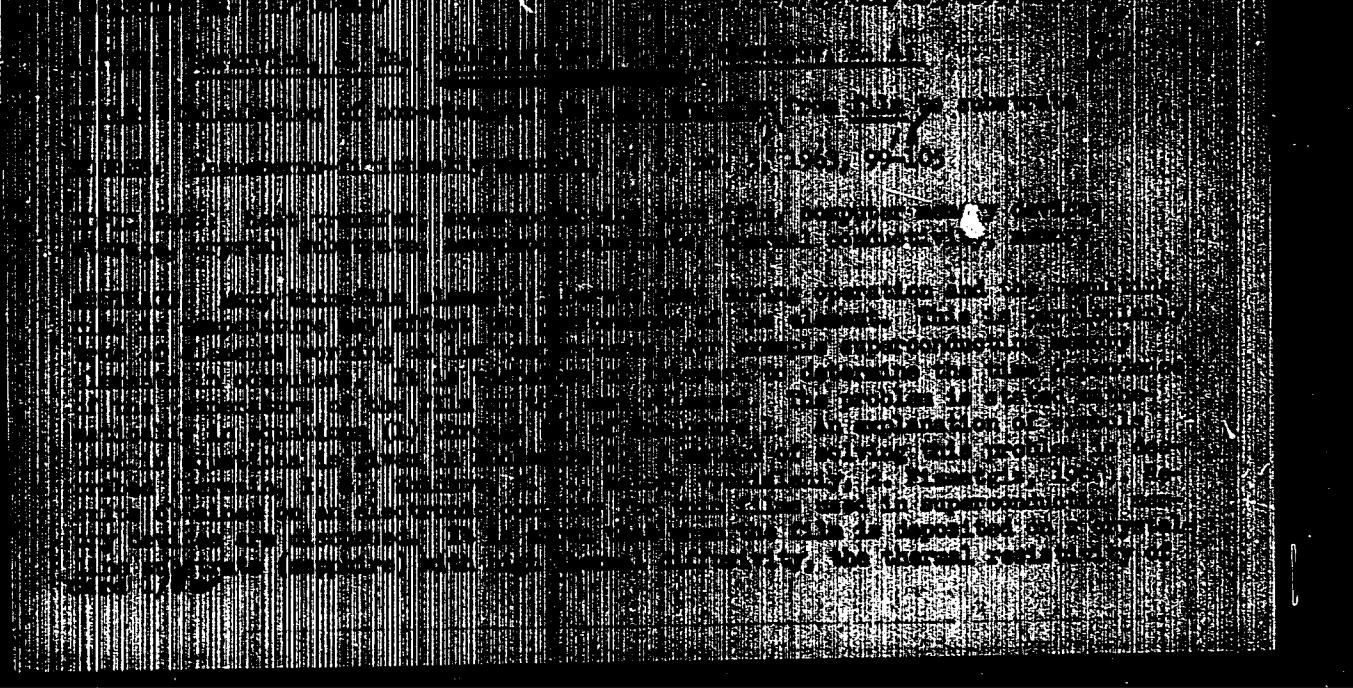
PURPOSE: This book is intended for workers in computing centers, students,  
aspirants, and scientific personnel employed in the field of computational  
mathematics.

COVERAGE: The book is the second volume in a series of works on the BESM-2, a modern  
version of the BESM, a universal, high-speed, digital computer developed by the  
Academy of Sciences USSR. The book discusses: the circuits of the arithmetic and  
control units; the basic standard blocks comprising the circuits of the arithmetic  
and control units; and methods of constructing on these elements the fundamental  
components of the computer: registers, counters, accumulators, decoders, etc.

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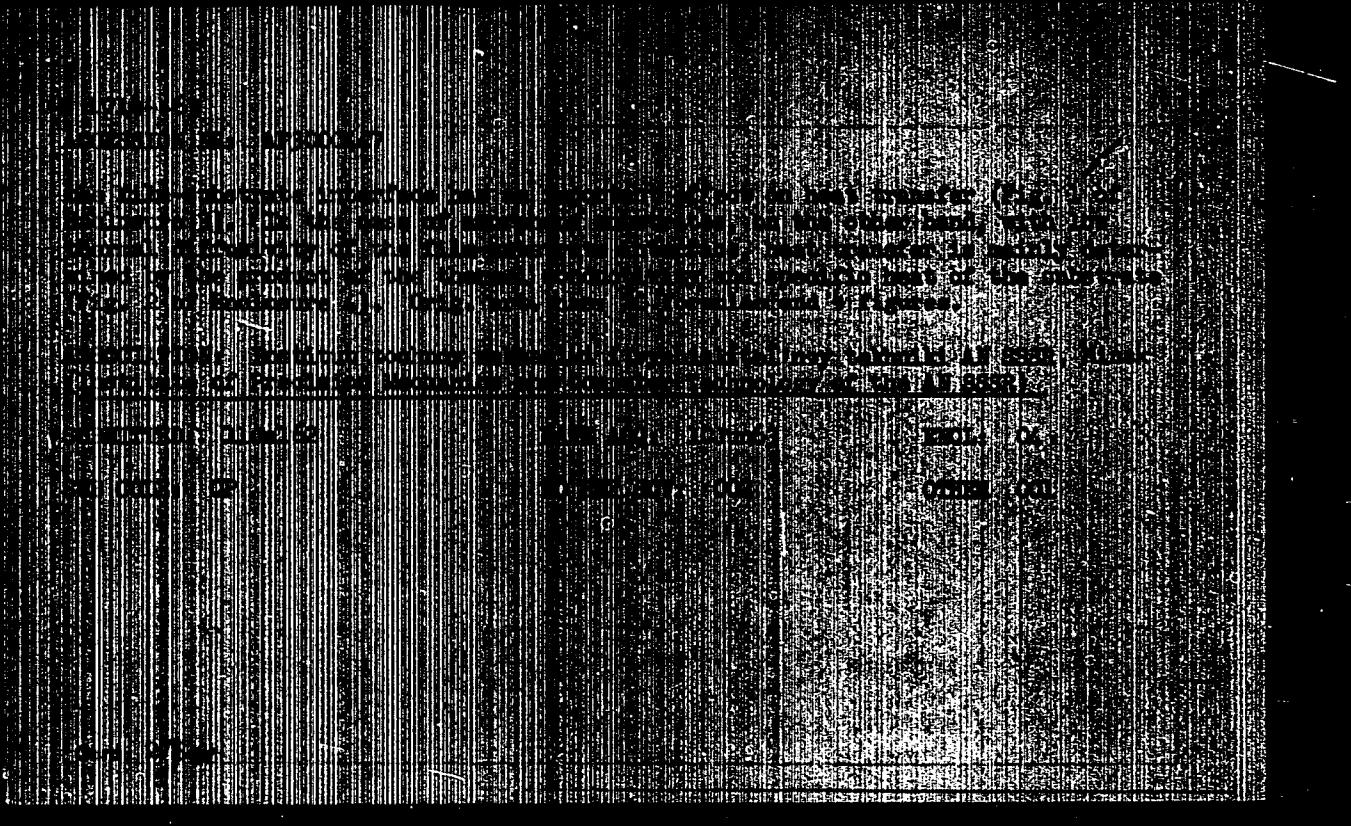


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KASHINTSEV, N.L.; LIPETSKII, S.S.; KAN, M.I.; GOLOVITSYN, S.V.

The MG-1 hydraulic markers. Trakt. i sel'khozmash. no. 10:  
35-36 O '64. (MIRK 17:12)

1. Gosudarstvennoye spetsial'noye konstruktorskoye byuro  
po mashinam dlya vozdelvaniya i uborki kartofelya.

GOLOVITSYN, S.K., inzh.; KAN, M.I., inzh.

Methods for comparing the parameters of potato planters. Trakt.  
i sel'khoz mash. no.12:19 D '65.  
(MIRA 18:12)

1. Gosudarstvennoye spetsial'noye konstruktorskoye byuro po  
mashinam dlya vozdelivaniya i uborki kartofelya.

Golovitsyn, S.S.

USSR / Chemical Technology. Chemical Products and Their Application. Leather. Fur. Gelatin. Tanning Agents. Technical Proteins. I-31

\* Abs Jour : Ref Zhur - Khimiya, No 3, 1957, No 10517

Author : Davydov, I.A., and Golovitsyn, S.S.

Inst : Not given

Title : Improvements in the Black Dyeing of Sheepskins

Orig Pub : Legkaya prom-st, 1956, No 6, 43-44

Abstract : An improved method has been developed for the black dyeing of Bulgarian and Russian sheepskins (young). Sulfuric acid has been excluded from the potassium dichromate mordanting bath with resulting change in the pH of the bath; in addition, dip-stuffing has been substituted for paste-stuffing. For the achievement of a deep black color and the prevention of the splitting off of the top grain, the authors recommend the application of an aniline solution (by machine) before

Card : 1/2

USSR / Chemical Technology. Chemical Products and Their Application. Leather. Fur. Gelatin. Tanning Agents. Technical Proteins.

Abs Jour : Ref Zhur - Khimiya, No 3, 1957, No 10517

Abstract : chroming and the substitution of acid-alcohol polish for formalin polish, with smoothing at a lower temperature. Batches produced by the above method have shown excellent quality.

Card : 2/2

GOLOVITSYN, Vasiliy Nikolayevich; SUBBOTIN, S.I., akademik, otv.  
red.; TRUTYAK, A.N., red.ind-va; TURBANOVA, N.A., tekhn.  
red.

[Electric prospecting (interpretation of data of direct current techniques)] Elektrorazvedka (interpretatsiia dannykh metodov postoiannogo toka). Kiev, Izd-vo AN Ukr.SSR, 1963.  
360 p.  
(MIRA 17:1)

1. Akademiya nauk Ukr.SSR (for Subbotin).

GOLOVITSYN, Yu.K.

From manual stamping to conveyor production. Za indus.Riaz. no.2;  
42-43 D "61.  
(MIRA 16:10)

1. Glavnyy metallurg upravleniya mashinostroitel'noy i radiotekhnicheskoy  
promyshlennosti Ryazanskogo soveta narodnogo khozyaystva,

GOLOVITSYN, Yurii Muz'mich; ZHARKOV, Petr Aleksandrovich, starshiy inzh.; SLAVNITSKAYA, N.N., red.; AZOVKIN, N.G., tekhn. red.

[Progressive procedures should be adopted in founding] Liteinomu proizvodstvu - progressivnuiu tekhnologiiu. Riazan', Riazanskoe kniazhnoe izd-vo, 1962. 32 p. (MIR4 15:12)

1. Glavnyy metallurg upravleniya mashinostroitel'noi i radio-tekhnikeskoy promyshlennosti Ryazanskogo sovmarkhoza (for Golovitsyn).
2. Upravleniye mashinostroitel'noy i radiotekhnicheskoy promyshlennosti Ryazanskogo sovmarkhoza (for Zharkov).  
(Founding)

GOLOVINA, V. Ya.; KLYUCHAREV, A. P.; SHILYAYEV, B. A.; SHLYAKHOV, N. A.

3

"Elastic Scattering of Protons with Energies 3.0 - 4.0 MeV on Cobalt and Isotopes of Chromium, Iron, and Copper."

report Submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

KhFTI (Ukrainian Physico Technical Inst, Khar'kov)

GLOVIZNIN, A. M., Cand Tech Sci (diss) -- "Analysis of the reversing qualities of the main engines of transport ships". Leningrad, 1960. 16 pp (Min Maritime Fleet USSR, Leningrad Higher Engineering Maritime School im Admiral S. O. Makarov), 200 copies (KL, No 15, 1960, 134)

GOLOVIZMIN, A.M.

Reversing properties of the main geared turbine unit and the  
inertial properties of the steamer "Sergei Botkin." Inform.  
sbor. TSNIIMQ no.44 Tekh. ekspl. mor. flota no.2:36-45 '59.  
(MIRA 16:10)

GOLOVIZNIN, A.M., kand.tekhn.nauk; GOL'DENFON, A.K., kand.tekhn.nauk;  
(GRIGOR'YEV, G.T.; KORNYAYEV, Yu.T.; SRABOV, K.Ye.; STRUMPE, P.I.,  
kand.tekhn.nauk, otv.red.; DRANITSYN, S.N., kand.tekhn.nauk, red.;  
GOROBETS, V.A., kand.voyen.-morskikh nauk, red.; YEVREINOV, I.V.,  
kand.tekhn.nauk; KORCHAGIN, M.I., kand.tekhn.nauk; KURZON, A.G.  
doktor tekhn.nauk; MIROSHNICHENKO, I.P., kand.tekhn.nauk;  
ROZHDESTVENSKIY, N.A., kand.tekhn.nauk; SYROMYATNIKOV, V.F.,  
kand.tekhn.nauk; BAMA, N.G., red.; STUL'CHIKOVA, N., tekhn.red.

[Marine nuclear steam turbine plants.] Sudovye iadernye  
p'oturbinnye ustanovki. Leningrad. Izd-vo "Morskoi transport,"  
1973. 135 p. Leningrad. TSentral'nyi nauchno-issledovatel'skiy  
institut morskogo flota. Informatzionnyi stornik, no. 77/78.  
Tekhnicheskaya eksploatatsiya morskogo flota, no. 15/16).  
(MIRA 17:2)

1. Sotrudnik TSentral'nogo nauchno-issledovatel'skogo  
instituta morskogo flota (for Goloviznin, Gol'denfon,  
Grigor'yev, Kornyayev, Srabov).

GOLOVIZMIN, I.P.

Agitator with regulated working width. Torf. prom. 40 no. 2:  
30-31 '63. (MIRA 16:4)

1. Prokop'yevskoye torfopredpriyatiye Kirovskoy oblasti.  
(Peat machinery)

GOLOVIZMIN, Vladimir Alekseevich; STYTS'KO, Petr Mitrofanovich;  
POD'yAKOV, A.S., red.; LARIOMOV, G.Ye., tekhn. red.

[Labor input and cost of concrete work in hydraulic engineering construction] Trudoemkost' i sebestoimost' betonnykh rabot v gidrotekhnicheskikh stroitel'stva. Moskva, Gosenergoizdat, 1962. 159 p. (MIRA 16:1)  
(Concrete construction) (Hydroelectric power stations)

1. KOROLEV, M. I.; SVETLOV, S. I.; GOLOVIN, A. N.; KOVALENKO, A. F.
2. USSR 600
4. Rolling Mills
7. Building foundations for rolling mills, Stroi. prom, 31, No. 1, 1959.
  
9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

CHUVATOV, V.V.; BEREZIN, N.N.; METSGER, E.Kh.; NAGIN, V.A.; KARTASHOV, N.A., kand. tekhn. nauk, dots.; MIL'KOV, N.V., kand. tekhn. nauk; BYCHKOV, M.I., kand. tekhn.nauk, dots.; SUKHANOV, V.P., SHLYAPIN, V.A.; KORZHENKO, L.I.; ABRAMYCHEV, Ye.P.; KAZANTSEV, I.I.; YARES'KO, V.F.; LUKOYANOV, Yu.N.; DUDAROV, V.K.; BALINSKIY, R.P.; KOROTHOVSKIY, A.E.; PONOMAREV, I.I.; NOVOSEL'SKIY, S.A., kand. tekhn.nauk, dots.; IL'INYKH, N.Z.; TSITKIN, N.A.; ROGOZHIN, G.I.; PRAVOTOROV, B.A.; ORLOV, V.D.; RACHINSKIY, M.N.; KULTYSHEV, V.N.; SMAGIN, G.N.; KUZZNETSOV, V.D.; MACHERET, I.G.; SHEGAL, A.V.; GALASHOV, F.K.; ANTIPIN, A.A.; SHALAKHIN, K.S.; RASCHENKTAYEV, I.M.; TISHCHENKO, Ye.I.; FOTIYEV, A.F.; IPPOLITOV, M.F.; DOROSINSKIY, G.P.; ROZHKOV, Ye.P.; RYUMIN, N.T.; AYZENBERG, S.L.; GOLUBTSOV, N.I.; VUS-VONSOVICH, I.K., inzh., retsenzent; GOLOVKIN, A.M., inzh., retsenzent; GUSELETOV, A.I., inzh., retsenzent; KALUGIN, N.I., inzh., retsenzent; KRAMINSKIY, I.S., inzh., retsenzent; MAYLE, O.Ya., inzh., retsenzent; OZERSKIY, S.M., inzh., retsenzent; SKOBLO, Ya.A., dots., retsenzent; SPERANSKIY, B.A., kand. tekhn. nauk, retsenzent; SHALAMOV, K.Ye., inzh., retsenzent; VOYNICH, N.F., inzh., red.; GETLING, Yu., red.; CHERNIKHOV, Ya., tekhn. red.

[Construction handbook] Spravochnik stroitelia. Red.kollegiia: M.I. Bychkov i dr. Sverdlovsk, Sverdlovskoe knizhnoe izd-vo. Vol.1. 1962. 532 p. Vol.2. 1963. 462 p. (MIRA 16:5)  
(Construction industry)

FLINT, V.Ie.; GOLOVKIN, A.N.

Role of the Tannu-Ola Range as a zoogeographical barrier and the  
origin of the desert-steppe fauna of Tuva. Zool. zhur. 40  
no.4:556-567 Ap '61. (MIRA 14:3)

1. Institute of Epidemiology and Microbiology, U.S.S.R. Academy  
of Medical Sciences (Moscow).  
(Tuva Autonomous Province--Zoogeography)

FLINT, V.Ye., GOLOVKIN, A.N.

Comparative ecological survey of the hamsters of Tuva. Biul. MOIP.  
Otd. biol. 66 no. 5:57-77 S-0 '61. (MIRA 14:10)  
(TUVA AUTONOMOUS PROVINCE—HAMSTERS)

GOLOVKIN, A.N.

Fishes as food for murres and kittiwakes during their nesting period in the Barents Sea. Zool. zhur. 42 no.3:408-416 '63.  
(MIRA 17:1)

1. Murmansk Marine Biological Institute, Dalniye Zelentsy,  
Murmansk region.

GOLOVKIN, A.N.; POSEN'YAKOVA, L.Ye.

Influence of colonial sea birds on the balance of biogenous elements in the coastal waters of Eastern Murman. Trudy NMIU no.6:88-98 '64.  
(MIRA 17:11)

I. Laboratoriya gidrologii i hidrokhimii Murmanskogo morskogo biologicheskogo instituta.

GOLOVKIN, A.N.; ZELINKMAN, E.A.

Development of Galanus in the breeding area of colonial sea birds  
of the Murmansk Coast. Okeanologija 5 no.1:117-127 '65. (MIRA 18:4)

1. Murmanskij morskoy biologicheskiy institut AN SSSR, Dal'niye  
Zelentsy.

BODRYY, M.; GUSEYNOV, M.; AGRETKIN, S.N., red.; ATADZHANOV, A.,  
red.; BIRAS, Ya.I., red.; GEL'DYEV, A., red.; GOLOVKIN,  
A.V., red.; MAMEDKULIYEV, A., red.; MATALOV, Ch., red.;  
KHAIMURADOV, B., red.

Sovet Turkmennistany. Soviet Turkmenistan. Ashkhabad,  
Turkmenskoe izd-vo, 1964. 103 p. [In Turkmen, Russian,  
English, and Arabic] (MIRA 18:4)

ALIMARIN, I.P.; SUDAKOV, F.P.; GOLOVKIN, B.G.

Use of N-benzoylphenylhydroxylamine in analytical chemistry.  
Usp.khim. 31 no.8:989-1003 Ag '62. (MIRA 15:8)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, khimi-  
cheskiy fakul'tet.  
(Hydroxylamine) (Chemistry, Analytical)

GOLOVKIN, Boris Ivanovich, inzh.; ROZHKOV, N., red.; NAGIBIN, P.,  
tekhn. red.

[Large-panel construction of dwellings in Kazakhstan] Krupno-  
panel'noe stroitel'stvo zhilishch v Kazakhstane. Alma-Ata,  
Kazakhskoe gos. izd-vo, 1962. 284 p. (MIRA 15:11)  
(Precast concrete construction)  
(Kazakhstan--Apartment houses)

GOLOVKIN, B.N.

Natural seedling of introduced plants in the Polar-Alpine Botanical Garden. Biul. Glav. bot. sada no. 41:22-26 '61. (MIRA 14:11)

1. Polaryerno-al'piyskiy botanicheskiy sad Kol'skogo filiala  
AN SSSR.  
(Kirovsk region—Plant introduction)  
(Plants—Reproduction)

GOLOVKIN, B.N.

Development of an assortment of plants for landscape gardening beyond the Arctic Circle. Probl. Sev. no.6:214-217 '62.

1. Polyarno-al'piyskiy botanicheskiy sad, Kirovsk.  
(Arctic regions—Landscape gardening) (MIRA 16:8)

GOLOVKIN, B.N.

Using wild flora for landscaping populated places in the Far North as  
exemplified by Murmansk Province. Probl. Sev. no. 7:128-134 '63.  
(MIRA 17:2)

AVRORIN, N.A.; ANDREYEV, G.N.; GOLOVKIN, B.N.; KAL'NIN, A.A.

[Plant introduction in Arctic regions Pereselenie rastenii na Polarnyj Sever. Moskva, Izd-vo "Nauka." Pt.1. [Results of the introduction of herbaceous plants in 1932-1956] Rezul'taty introduktsii travianistykh rastenii v 1932-1956 gg. 1964. 498 p. (MIRA 17:8,

1. Polyarno-mal'piyskiy botanicheskiy sad.

GOLOVKIN, B.N.

How the *Ornithogalum schmalhausenii* bulbs work deeper into  
the soil. Biul. Glav. bot. sada no.55:35-37 '64.

I. Polyarno-al'piyskiy botanicheskiy sad Kol'skogo filiala  
imeni S.M. Kirova AN SSSR, g. Kirovsk Muranskoy oblasti.  
(MIRA 18:11)

GOLCVKIN, H.N.

Botanical gardens of Iceland. Biul. Glav. bot. sada no. 57:107-  
109 '65.  
(MIRA 18:9)

1. Polyarno-al'piyskiy botanicheskiy sad Kol'skogo filiala imeni  
Kirova AN SSSR, Kirovsk.

GOLOVKIN, B.N.

Life-span of bulbaceous plants. Bot. zhur. 50 no.11,  
1642-1645 N '65.

1. Pol'yarno-Al'tpiyskiy botanicheskiy sad, g. Kirovsk,  
Murmanskoy oblasti. (MIRA 19:1)

~~GOLOVKIN, D. A.~~

Some economic geography prerequisites for the development of  
tea growing in the regions of Central Asia and Kazakhstan.  
Trudy Glav. bot. sada 5:139-151 '56.

(MLRA 9:10)

(Asia, Central---Economic geography)  
(Kazakhstan---Economic geography)  
(Tea)

*GOLOVKIN, D.A.*  
GOLOVKIN, D.A.; KHAUSTOVA, N.N.

Scientific session on aspects of the geography of eastern Siberia.  
Inv. AN SSSR, Ser. geog. no. 5:137-139 8-0 '57. (MIRA 11:2)  
(Siberia--Economic geography)

GOLLOVKIN, D. A.: Master Geogr Sci (diss) -- "The Mimusinsk basin (Natural and economic resources and their utilization)". Moscow, 1958. 16 pp (Acad Sci USSR, Inst of Geography) (KL, No 6, 1959, 127)

AUTHOR: Golovkin, D.A. SV-10-58-4-11/28

TITLE: Natural and Economic Resources of the Extreme Southern Part of the Krasnoyarsk Region and Their Utilization (Prirodnyye i ekonomicheskiye resursy kraynego yuga Krasnoyarskogo kraya i puti ikh ispol'zovaniya)

PERIODICAL: Izvestiya Akademii nauk SSSR - Seriya geograficheskaya, 1958, Nr 4, pp 79-82 (USSR)

ABSTRACT: The author speaks of the industrial importance of the extreme southern part of the Krasnoyarsk region with special stress on its vast natural resources, such as coal, iron ore, non-ferrous metals and water power. Over the past few years, this region has seen an enormous rise in industrial production, especially in the metal working industry. Forestry and cattle-raising, an essential part of the economy of this region, also have good prospects for future development.

ASSOCIATION: Institut geografii AN SSSR (Institute of Geography of the AS USSR)  
1. Social sciences--USSR    2. Industry--Development

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SOV/10-59-4-12/29

AUTHOR: Golovkin, D.A.

TITLE: Regions of the Southernmost Part of Krasnoyarskiy Krai. Their Future Economic Development

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geograficheskaya, 1959, Nr 4, pp 97-101 (USSR)

ABSTRACT: The article gives both an economic survey and future outlooks of the southernmost areas of the Krasnoyarskiy Krai, the Khakasskaya avtonomnaya oblast' (Khakassia Autonomous Oblast'), or Khakasiya, and the Pravoberezh'ye (Right Bank Area of the Yenisey River). In geographical sense, this area is also called Minusinskaya kotlovina (Minusinsk Depression). Khakasiya has a considerable industry (iron ore, coal, and wood) since it is connected with the Great Siberian Railroad by the Achinsk-Abakan Railroad, whereas the Right Bank Area is a purely agricultural district and lacks rail facilities. The Yenisey River, while flowing through Khakasiya, has a potential capacity of 4 million

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Regions of the Southernmost Part of      "rasnoyarskiy Kray. Their  
Future Economic Development

kw. Apart from iron ore, Khakasiya is also rich in limestone (Yerbinskoye limestone deposit). Wood reserves there exceed 360 million cu m. During the 7-Year Plan, Khakasiya's economy will largely depend on her iron and lumber industries and to a lesser degree on agriculture. Ore production is scheduled to rise 4 to 5 times (enlargement of the Abakanskiy and putting into service the Teyskiy and Anzasskiy rud-niki) (Abakan, Teyskiy, and Anzasskiy Ore Mines). The economy of the Right Bank Area is primarily based on agriculture. During the next years, the last link of the South Siberian Railroad, the Abakan-Tayshet section will be completed and the exploitation of the mineral wealth and forest resources of this area will begin. The iron ore reserves of the western slopes of the Eastern Sayan range exceed 50 million tons, with

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SCV/10-59-4-12/29

Regions of the Southernmost Part of Krasnoyarskiy Kray. Their Future Economic Development

iron content of 47-55 %. Large deposits of titanomagnetic ore were discovered near Artemovsk and those of natural gas near Minusinsk. The total volume of wood reserves is estimated in this area at about 500 million cu m. There is 1 Soviet reference.

ASSOCIATION: Institut geografii AN SSSR (Institute of Geography AS USSR)

Card 3/3

GOLOVIN, D.A.; SIL'VESTROV, S.I.; SOBOL'EV, L.N.

International Conference on Methods of Land Utilization organized  
by Polish geographers. Inv. AN SSSR. Ser. geog. no.6:118-121 N-D  
'60.  
(MIRA 13:10)

1. Institut geografii AN SSSR.  
(Land--Congresses)

GOLOVKIN, D.A.

Agricultural regions of the Minusinsk Basin. Sib.geog.sbor.  
no.1177-84 (61). (MIRA 16:2)  
(Minusinsk Basin—Agricultural geography)

BANDMAN, M.K.; BUTANTUYEV, B.R.; POMUS, N.I.; RADNAYEV, G.Sh.;  
GOLOVKIN, D.A.; GRIGOR'YEVA, A.A.; KROTOV, V.A.;  
TCHUMCHIKOV, N.Ya.; KORZHUEV, S.S.; SHATSILC, Ye.S.;  
KOISMACHEV, K.P.; NAUMOV, G.V.; LIKHANOV, B.N.; PETUKHOV,  
V.G.; TIKHONOV, A.V.; NEDESHEV, A.A.; SIMANOVSKIY, G.M.;  
SHAKHUNOVA, F.A.; SHOTSKIY, V.P.; YEROFEYEV, I.A., red.;  
POLOZHENTSYeva, T.S., mladshiy red.; GOLITSYN, A.B., red.  
kart; VILENSKAYA, E.N., tekhn. red.

[Eastern Siberia; economic geography] Vostochnaya Sibir';  
ekonomiko-geograficheskaya kharakteristika. Moskva, Geog-  
rafiadat, 1963. 885 p. (MIRA 16:10)  
(Siberia, Eastern--Economic geography)

SOKOLOV, B.; LISTOPAD, G.; ABRAMOV, I., prepodavatel'; SUSLIK, V.  
(Krasnodarskiy kray); GOLOVKIN, F.; SHAMOYEV, A. (Penzaeskaya obl.)

Readers' letters. Posh.delo 9 no.7:30 Jl '63. (MIRA 16:10)

1. Sverdlovskoye posharmo-tekhnicheeskoye uchilishche (for Abramov).
2. Inspektor posharmoy okhrany, Kandalaksha, Murmanskaya obl.  
(for Golovkin).



ZARUTSKIY, V.V.; ARAKELYAN, V.G.; OSTROVSKIY, S.A.; GOLOVKIN, G.V.

Improving the sensitivity of the detector in a Kh.T.-2N device.  
Zav. lab. 30 no.10:1286 '64.  
(MIRA 18:4)

1. Institut organicheskoy khimii imeni Zelinskogo AN SSSR.

GOLOVKIN, G.V.; FRYANISHNIKOVA, M.A.; KONONOV, N.F.; PLATE, A.F.; ZARUTSKIY, V.V.

Preparation of bicyclo[2,2,1]hepta-2,5-diene; effect of the nature  
of phlegmatizer, temperature, pressure, and cyclopentadiene feed  
rate. Izv. AN SSSR. Ser. khim. no.10:1850-1855 '65.

(MIRA 18:10)

1. Institut organicheskoy khimii im. N.D.Zelinskogo AN SSSR.

GOLOVKIN, I.

Training of commanders. Poch. delo 9 no. 5:22 My '63. (MIRA 16:5)

I. Zamestitel' nachal'nika Moskovskogo uchebnogo otryada posharnoy  
obhrany.

(Fire prevention—Study and teaching)

25609

S/517/60/059/000/002/006  
B112/B20224.4300

AUTHOR: Golovkin, K. K.

TITLE: Plane motion of a viscous incompressible fluid

PERIODICAL: Akademika nauk SSSR. Matematicheskiy institut. Trudy,  
v. 59, 1960, 37-86

TEXT: The Navier - Stokes equations describe the motion of a viscous incompressible fluid. For these equations J. Leray formulated certain boundary value problems in a fundamental paper (*Essai sur les mouvements plans d'un liquide visqueux que limitent des parois*, J. Math. pures et appl., S. IX, 13, N4(1934), 331-418) which he partly solved. The author presents their solvability in the classical sense. For this purpose, he uses potential theoretical methods (for linearized problems) on the one hand, and the existence of a generalized (non-classical) solution (for nonlinear problems) on the other. The studies of the authors are limited to plane flows within convex regions. In potential theory convexity is no essential limitation. In chapter I the author derives some important estimates on the basis of the theory of the nonstationary hydrodynamical potentials. He proceeds from the

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Plane motion of a viscous ...

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linearized Navier - Stokes equations:

$$\rho \ddot{u}(x, y, t) - \partial \dot{u}(x, y, t) / \partial t - \text{grad } p(x, y, t) = 0,$$

$$\text{div } \dot{u}(x, y, t) = 0$$

with the boundary and initial conditions:

$$\dot{u}(x, y, t) \mid_{(x, y) \in \Gamma} = \bar{u}(s, t); \quad \dot{u}(x, y, t) \mid_{t=0} = 0$$

According to Leray this problem has a solution:

$$(x - tv)(x, y, t) = \int \frac{\nabla(s, t) e^{-\alpha(s)}}{x - tv} ds + \\ + \int dt \oint (s, t) e^{-\alpha(s)} [(U - IV)(XY, t - s)] ds. \quad (1.1)$$

X and Y are the coordinates "accompanying" the boundary curve  $\Gamma$ .  $V(t)$  denotes the maximum amount of the velocity vector  $\dot{u}$  within the region  $\Omega$  bounded by  $\Gamma$ ,  $U(t)$  denotes the maximum amount of  $\partial \dot{u} / \partial t$  in  $\Omega$  and  $V'(t)$  the maximum norm of the velocity gradient. Chapter II contains existence.

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Plane motion of a viscous ...

theorems for classical solutions of the linear boundary value problems

$$\left. \begin{array}{l} \nabla u(x_1, x_2, t) - \frac{\partial u(x_1, x_2, t)}{\partial t} - \frac{\partial p(x_1, x_2, t)}{\partial x} = 0, \\ \operatorname{div} u(x_1, x_2, t) = 0, \\ u(x_1, x_2, t)|_{t=0} = u(x_1, x_2, 0), \quad u(x_1, x_2, t)|_{(x_1, x_2) \in \Gamma} = 0. \end{array} \right\} \quad (\text{II})$$

and

$$\left. \begin{array}{l} \nabla u(x_1, x_2, t) - \frac{\partial u(x_1, x_2, t)}{\partial t} - \frac{\partial p(x_1, x_2, t)}{\partial x} = f(x_1, x_2, t), \\ \operatorname{div} u(x_1, x_2, t) = 0, \\ u(x_1, x_2, t)|_{(x_1, x_2) \in \Gamma} = 0, \quad u(x_1, x_2, t)|_{t=0} = 0. \end{array} \right\} \quad (\text{III})$$

To derive these existence theorems, estimates of  $V(t)$ ,  $U(t)$  and  $V'(t)$  are necessary which have been obtained in chapter I. At the end of chapter II studies are described on the behavior of the derivatives of the solutions.

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In chapter III the author deals with the nonlinear boundary value problem by means of the complete Navier-Stokes equations:

$$\left. \begin{aligned} v \Delta \vec{u}(x_1, x_2, t) - \partial \vec{u}(x_1, x_2, t) / \partial t - \partial p(x_1, x_2, t) / \partial \vec{x} = \\ = \partial(\vec{u}, u_k) / \partial x_k + \vec{f}(x_1, x_2, t), \end{aligned} \right\} \quad (IV)$$

$$\operatorname{div} \vec{u}(x_1, x_2, t) = 0$$

and the boundary and initial conditions:

$$\vec{u}(x_1, x_2, t) \quad (x_1, x_2) \in \Gamma = 0, \quad \vec{u}(x_1, x_2, t) \quad t=0 = \vec{u}(x_1, x_2, 0). \quad (IV')$$

The recursive systems

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$$\begin{aligned} v \Delta u_{n+1}(x_1, x_2, t) - \frac{\partial u_{n+1}(x_1, x_2, t)}{\partial t} - \frac{\partial p(x_1, x_2, t)}{\partial x_1} &= \\ = \frac{\partial (u_n u_{n+1})}{\partial x_2} + f(x_1, x_2, t)_r & \\ \operatorname{div} u_{n+1}(x_1, x_2, t) &= 0, \\ u_{n+1}(x_1, x_2, t)|_{(x_1, x_2) \in \Gamma} &= 0, \\ u_{n+1}(x_1, x_2, t)|_{t=0} &= u(x_1, x_2, 0). \end{aligned} \quad \left. \right\} \quad (9.3)$$

reduce the boundary value problem (IV), (IV') to a series of linear problems to which the results of the preceding chapter can be applied. Finally the author studies the local behavior of the derivatives of the generalized solution. There are 1 figure and 5 references: 1 Soviet-bloc and 4 non-Soviet-Bloc.

Card 5/5

16.350024.4300

AUTHOR:

Golovkin, K. K.

TITLE:

Potential theory for nonstationary linear Navier-Stokes  
equations in the case of three space variables

PERIODICAL:

Akademiya nauk SSSR. Matematicheskiy institut. Trudy,  
v. 59, 1960, 87-99TEXT: The author constructs a so-called "second fundamental solution" of  
the following boundary value problem:

$$\frac{\partial G_{ij}}{\partial t}(x_1, x_2, x_3, t) - \Delta G_{ij} - \frac{\partial P_j}{\partial x_i} = 0, \\ \sum_{i=1}^3 \frac{\partial G_{ij}}{\partial x_i} = 0; G_{ij}(x_1, x_2, 0, t) = \delta_{ij} \delta(t) \delta(x_1, x_2), G_{ij}|_{t=0} = 0 \quad \left. \right\} (I)$$

(x<sub>3</sub> > 0, j = 1, 2). This solution is

$$\vec{G}_j(x, t) = -2\vec{T}_j/\partial x_3 + \sum_{i=1}^2 (\frac{\partial \vec{T}_i}{\partial x_3} * _1 M_{ij}) + \text{grad}(\frac{1}{r} *_2 L_j),$$

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$$\text{where } T_{ij}(x, t) = \delta_{ij} \Gamma(x, t) + \frac{1}{4\pi} \frac{\eta^2}{\partial x_i \partial x_j} \int_{E_3} \frac{1}{r_{xy}} \Gamma(y, t) dy,$$

$$\Gamma(x, t) = \exp(-r^2/4t)/(4\pi t)^{3/2} \text{ for } t > 0, \Gamma(x, t) = 0 \text{ for } t < 0,$$

$$M_{ij}(x_1, x_2, t) = \frac{2}{\pi} \frac{\eta^2}{\partial x_i \partial x_j} \int_{E_3} \frac{1}{r_{xy}} \Gamma(y_1, y_2, 0, t) dy_1 dy_2 \text{ and } L_j(x_1, x_2, t)$$

$$= \frac{1}{\pi} \frac{\eta}{\partial x_j} \Gamma(x_1, x_2, 0, t). *_1 \text{ denotes convolution with respect to time and}$$

the plane  $x_3 = 0$ .  $*_2$  denotes convolution with respect to the plane  $x_3 = 0$ .

By means of the "second fundamental solution" the problem:

$$\frac{\partial \vec{v}(x, t)}{\partial t} - \Delta \vec{v} - \text{grad } p = 0, \text{ div } \vec{v}(x, t) = 0, \left. \vec{v}(x_1, x_2, x_3, t) \right|_{x_3=0} = 0 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\}$$

$$v_i(x_1, x_2, x_3, t) \Big|_{x_3=0} = \phi_i(x_1, x_2, t), i = 1, 2; v_3(x_1, x_2, x_3, t) \Big|_{x_3=0} = 0$$

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can be solved in the form:

$$v(x_1, x_2, x_3, t) = \sum_{j=1}^2 (\vec{G}_j *_1 \phi_j)$$

The problem

$$\left. \begin{array}{l} \partial \vec{u}(x, t) / \partial t + \Delta \vec{u}(x, t) - \text{grad } p(x, t) = 0, \text{ div } \vec{u}(x, t) = 0, \\ \vec{u}|_{t=0} = 0, \vec{u}|_S = \vec{u}(s, t) \end{array} \right\}$$

can be solved in the form:

$$u_i^{(1)}(x, t) = \sum_{k=1}^2 \int_0^t d\tau \int_s^t g_{1k}(y, t - \tau) a_{il}(s) \phi_k(s, \tau) ds,$$

$$u_i^{(2)}(x, t) = \frac{1}{\delta x_i} \int_S \frac{\Psi(s, t)}{r} ds,$$

where  $\phi$  and  $\Psi$  must satisfy the conditions:

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Potential theory for ...

$$\mathbf{p}^{(1)}(\mathbf{x}, t) = \sum_{k=1}^{\infty} \int_0^t d\tau \int \mathbf{p}_k(\mathbf{y}, t - \tau) \phi_k(\mathbf{s}, \tau) ds,$$

$$\mathbf{p}^{(2)}(\mathbf{x}, t) = \int_0^t \frac{\nabla \times (\mathbf{u} - \mathbf{v})}{r} ds,$$

The following relation exists between  $\mathbf{v}$  and  $\mathbf{u}$ :

$$\mathbf{v}_1 = \sum a_{ik}(s) \mathbf{x}_k + v_1(s),$$

where the coefficients  $a_{ik}$  are the elements of an inverse matrix. The problem is equivalent to the system of integral equations (33).  $R_{ik}(\mathbf{G}, s, t)$  are the values of  $\mathbf{G}_{ik}(\mathbf{y}, t)$  on  $S$ . System (33) is solved by the series

$$\Psi^{(n+1)} = \sum_{n=1}^{\infty} \Psi^{(n)}(\mathbf{x}, t) - \phi^{(n+1)} = \sum_{n=1}^{\infty} \phi^{(n)}$$

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Potential theory for ...

S/517/60/059/000/003/006  
B112/B202whose terms  $\Psi^{(n)}$  and  $\Phi^{(n)}$  can be calculated recursively:

$$\begin{aligned} 2\pi\Psi^{(n+1)}(\sigma, t) &= \int_s^t \frac{\Psi^{(n+1)}(s, \tau) \cos(r_1, r_2)}{r_{s\tau}} d\tau + a_{31}(\sigma) \sum_{k=1}^3 \int_0^t d\tau X_k \\ &\quad \times \int_s^t R_{1k}(a_{11}(s, \tau) a_{11}(s) \Phi_k^{(n)}(\tau)) d\tau = 0, \\ \Phi_n^{(n+1)}(\sigma, t) &= - \sum_{k=1}^3 a_{m1}(\sigma) \int_0^t d\tau \int_s^t R_{1k}(a_{11}(s, \tau) a_{11}(s) \Phi_k^{(n)}(\tau)) d\tau + \\ &\quad + a_{m1}(\sigma) \frac{d}{ds} \int_s^t \frac{\Psi^{(n+1)}(s, \tau)}{r_{s\tau}} d\tau \quad (m=1, 2), \end{aligned}$$

There are 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

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16. 350024. 4300

25611  
S/517/60/059/000/004/006  
B112/B202

AUTHORS: Golovkin, K. K., Ladyzhenskaya, O. A.

TITLE: Solutions of a nonstationary boundary value problem for  
the Navier-Stokes equationsPERIODICAL: Akademija nauk SSSR. Matematicheskiy institut. Trudy,  
v. 59, 1960, 100-114

TEXT: The authors consider the Navier-Stokes equations:

$$\left. \begin{aligned} \vec{v}_t + v_k \vec{v}_k - \Delta \vec{v} + \text{grad } p = \vec{f} \\ \text{div } \vec{v} = 0 \end{aligned} \right\} \quad (1)$$

with the boundary and initial conditions-

$$\vec{v}|_{S_1} = 0, \vec{v}|_{t=0} = \vec{g}(x), (\text{div } \vec{g} = 0) \quad (2)$$

in a domain  $Q_1 = \Omega \times [0 < t \leq 1]$ .  $\Omega$  is bounded by  $S$ ,  $\vec{f}(x,t)$  belongs to  $L_2(Q_1)$ ,  $\vec{g}(x)$  to  $L_2(\Omega)$ . A vector  $\vec{v}(x)$  is called a "weak solution" of the problem (1) - (2), if it is quadratically summable over  $\Omega$  for any  $t$  from

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[0,1], if  $\vec{v}_k$  is from  $L_2(Q_1)$ , and if the condition:

$$\int_{\Omega} \left[ \vec{\phi}_t + \vec{v}_k \vec{\phi}_x \right] dx dt = \int_{\Omega} \vec{a} \vec{\phi} \Big|_{t=0} dx = \int_{\Omega} \vec{\phi} \left[ -v_k \vec{v}_x - \vec{i} \right] dx dt \quad (3)$$

is satisfied for any smooth solenoidal vector  $\vec{\phi}(x,t)$  vanishing for  $t=1$ . The present paper is based on the following principal theorem: if  $\vec{v}(x,t)$  is in  $L_2(Q_1)$  and  $\vec{a}(x)$  from  $L_2(\Omega)$  every weak solution:  $\vec{v}, p$  of the problem

(1)-(2) has derivatives:  $\vec{v}_t, \vec{v}_{x_i x_j}, p_{x_i}$  which are from  $L_{5/4}(Q_1)$ . This

theorem is proved by a theory of nonstationary hydrodynamic potentials which had been developed by K. K. Golovkin (Akademiya nauk SSSR. Matematicheskiy institut. Trudy. v. 59, 1960, 87 - 99). S. G. Mikhlin is mentioned. There are 10 references: 6 Soviet-block and 3 non-Soviet-block. The most important reference to English language publications reads as follows: O. A. Ladyzhenskaya, Solution Directe de la Problème de la Nonstationnaire Boundary Value Problem for the Stokes System with Two Space Variables. Communications in Pure and Applied Mathematics XII,

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Solutions of a nonstationary...  
(:959), 403-425.

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B112/B2C2

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84568

16.4600

S/020/60/134/001/025/038 XX  
C111/C222AUTHOR: Golovkin, K.K.TITLE: On Imbedding Theorems ✓

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 1, pp. 19-22

TEXT: Let  $F[u(x)]$  be a homogeneous functional being invariant with respect to shifts of the argument and given on a set of finite functions; let the diameter of the region of finiteness of this function be  $\leq d$ .Definition 1:  $F[u(x)]$  has the dimension  $\alpha$  if  $F[u(\lambda x)] = \lambda^{-\alpha} F[u(x)]$ .Definition 2:  $F[u(x)]$  is  $p$ -additive if  $F\left[\sum_{i=1}^N u(x-x_i)\right] = N^{1/p} F[u(x)]$ , $1 \leq p \leq \infty$ , where the regions of finiteness of the single summands of the sum are far from each other by a multiple of the diameters of the single summands, while the diameter of the region of finiteness of the sum is  $\leq d$ . XDefinition 3:  $1 - \frac{m - k}{p}$  denotes the differential order of a functional

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## On Imbedding Theorems

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with the above properties, where  $n$  is the dimension of the space.  
Lemma: If  $P_1$  and  $P_2$  have the dimensions  $\alpha_1$  and  $\alpha_2$  and the differential  
orders  $l_1$  and  $l_2$ , then for the validity of the estimation

$$(1) \quad P_1[u(x)] \leq C P_2[u(x)],$$

where  $C$  does not depend on  $u(x)$  it is necessary that  $\alpha_1 \geq \alpha_2$  and  
 $l_1 \leq l_2$ .

The lemma permits often to prove the necessity of certain conditions in  
the imbedding theorems without constructing examples.

Let  $E_s$  be an  $s$ -dimensional plane of the  $E_n$ ,  $E_{n-s}$  be the orthogonal  
complement of  $E_s$ ;  $x \in E_n$ ;  $x^i \in E_s$ ,  $x^n \in E_{n-s}$ . Let  $W_p^{1,n-s}$  be the space  
of functions defined in  $\Omega \subseteq E_n$ , satisfying cone conditions, having  
derivatives of 1-th order with respect to  $x^n$  and being summable in  $p$ -th

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## On Imbedding Theorem

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power in  $\Omega$ . The norm in  $W_p^{1,n-s}$  is defined as

$$\left\{ \int_{\Omega} \sum_{k_1+\dots+k_{n-s}=1} \left( \frac{\partial^{1-n}}{\partial x_1^{\alpha_{k_1}} \dots \partial x_{n-s}^{\alpha_{k_{n-s}}}} \right)^p dx + \int_{\Omega} |u|^p dx \right\}^{1/p}$$

Theorem 1: If  $p_1 > n-s$ ,  $lq > n-s$ ,  $q > p > 1$ , then it holds:

$$(2) \|u\|_{Lq(E_s \cap \Omega)} \leq C \|u\|_{W_p^{1,n-s}(\Omega)}^{\frac{n-s}{lq}} \|u\|_{\frac{p(lq-n+s)}{lp-n+s}}^{\frac{lq-n+s}{lq}}$$

Theorem 2: If  $1 > \alpha > \frac{r-h}{1-h}$ ;  $p_r, p_1 > 1$ ;  $\frac{1}{p_r} > \frac{r-h}{n} + \alpha \left( \frac{1}{p_1} - \frac{1-h}{n} \right)$ , then

it holds:

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## On-Embedding Theorems

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$$\|u\|_{W_{p_r}}^{(r)} \leq c \|u\|_{W_{p_1}}^{(1)} \|u\|_{Lip h}^{1-\alpha}$$

The theorems contain assertions on the non-trivial imbedding of the intersection of two spaces within a third one in the case where none of the two first spaces is wholly contained in the third one.  
 The author mentions S.L. Sobolev and V.P. Il'in. There are 5 references:  
 2 Soviet and 3 Italian.

ASSOCIATION: Leningradskoye otdeleniye matematicheskogo instituta imeni V.A. Steklova Akademii nauk SSSR (Leningrad Department of the Mathematical Institute imeni V.A. Steklov of the Academy of Sciences USSR)

PRESENTED: April 18, 1960, by V.I. Smirnov, Academician

SUBMITTED: April 9, 1960

Card 4/4

GOLOVKIN, N. N.

Conditions for the smoothness of functions. Dokl. AN SSSR 134 no.6:  
1283-1286. 0 '60.  
(MIRA 13:10)

I. Leningradskoye otdeleniya Matematicheskogo instituta im. V.A.Steklova  
Akademii nauk SSSR. Predstavлено akademikom V.I.Smirnovym.  
(Functional analysis)

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000515820010-9

GOLOVKIN, K.K.

One property of the norm in  $L_p$  as a function of p. Vest.IGU  
16 no.19:16-22 '61. (MIRA 14:10)  
(Banach spaces)

APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000515820010-9"

DOLOVKIN, K.K.

Two classes of inequalities for sufficiently smooth functions of  
n variables. Dokl.AN SSSR 138 no.1:22-25 My-Je '61.  
(MIRA 14:4)

1. Leningradskoye otdeleniye Matematicheskogo instituta im. V.A.  
Steklova. Predstavлено академиком V.I.Smirnovym.

(Inequalities (Mathematics)) (Functional analysis)

GOLOVKIN, K.K.

Certain conditions for the smoothness of functions of several variables and for the evaluation of convolution operators.  
Dokl. AN SSSR 139 no.3:524-527 Jl '61. (MIRA 14:7)

1. Leningradskoye otdeleniye Matematicheskogo instituta im. V.A. Steklova Akademii nauk SSSR.  
(Functions of several variables) (Operators (Mathematics))

16 350024.4300

28658

S/020/61/140/002/003/023  
C111/C444

## AUTHORS:

Golovkin, K. K., Solonnikov, V. A.

## TITLE:

The first boundary value problem for the non-stationary  
Navier-Stokes equations

## PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 140, no. 2, 1961,  
287-290

TEXT: Let  $\Omega$  be a bounded domain in  $E_3$ , which is bounded by the surface  $S$  which is of the Lyapunov type with the exponent  $\alpha$ . The existence of the classical solution of the problem

$$\frac{\partial u}{\partial t} = \nu \Delta u + \text{grad } p = u_k \frac{\partial u}{\partial x_k} + f, \quad \text{div } u = 0, \quad (6)$$
$$u|_S = 0 \quad u|_{t=0} = a (\text{div } a(x) = 0),$$

is proved by consideration of the sequence ( $n = 0, 1, 2, \dots$ ) of the linear problems

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The first boundary value problem . . .

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$$\frac{\partial \mathbf{u}_{n+1}}{\partial t} - \nu \Delta \mathbf{u}_{n+1} + \text{grad } p_{n+1} = \mathbf{u}_{n,k} \frac{\partial \mathbf{u}_n}{\partial x_k} + \mathbf{f},$$

$$\text{div } \mathbf{u}_{n+1} = 0, \quad \mathbf{u}_{n+1}|_S = 0, \quad \mathbf{u}_{n+1}|_{t=1} = \mathbf{a} \quad (7)$$

putting  $\mathbf{u}_n(x, t) = 0$ . The convergence of this process is examined by the method of J. Leray (Ref. 8: J. Leray, J. Math. pures et appl., S. IX, 13, no. 4, 351 (1934)), where the following estimations are used: Consider the problem

$$\frac{\partial \mathbf{u}}{\partial t} - \nu \Delta \mathbf{u} + \text{grad } p = \mathbf{f}(x, t), \quad \text{div } \mathbf{u}(x) = 0 \quad (3)$$

$$\mathbf{u}|_S = \mathbf{u}(s, 0), \quad \mathbf{u}|_{t=0} = \mathbf{a}(x), \quad x \in \Omega, \quad t > 0$$

under the supposition  $\int_S (\mathbf{u}(s, t) \cdot \mathbf{n}(s)) ds = 0$ ,  $\text{div } \mathbf{a}(x) = 0$ ,

where  $\mathbf{n}(s)$  is the unit vector of the normal of  $S$ . Let  $M(\Omega, \beta)$  be

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the space of the vector functions  $\mathbf{v}(x)$  which are given in  $\Omega + S$ , with the finite norm

$$\max_{x, x' \in \Omega + S} \frac{|v(x) - v(x')|}{|x - x'|^\beta} + \max_{x \in \Omega + S} |v(x)| \equiv \|v(x)\|_{M(\Omega, \beta)},$$

$$\|u(x, t)\|_{M(\Omega, \beta)} \equiv v_\beta(t)$$

1. Let  $u(x, t)|_S \equiv 0$ ;  $\mathbf{f}(x, t) \equiv 0$ ;  $a(x) \in M(\Omega, \beta)$ .

Then

$$v_\beta(t) \leq B \|a(x)\|_{M(\Omega, \beta)} e^{-\gamma vt}, \quad (4)$$

where the constant B depends on  $\Omega$ ,  $\beta$ ,  $\beta'$  and  $\gamma = \text{const}$  only on  $\Omega$ .3. Let  $u(x, t)|_S \equiv 0$ ,  $a(x) \equiv 0$ ,  $r_i(x, t) = \frac{\partial R_{i,1}}{\partial x_j} + F_i$  where

$$\sum_{i=1}^3 \|R_i\|_{M(\Omega, \beta)} \leq \varphi(t), \|F\|_{M(\Omega, \beta)} \leq \psi(t), \text{ where } R_i = (R_{i,1}, R_{i,2}),$$

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R<sub>1,3</sub>). Then

$$V_A(t) \leq \int_0^t \left\{ \frac{B_0 + v(t-\tau)}{[v(t-\tau)]^{1+\delta}} + Be^{-\gamma v(t-\tau)} \right\} \varphi(\tau) d\tau + \\ + \int_0^t \left\{ \frac{B_0 + v(t-\tau)}{[v(t-\tau)]^\delta} + Be^{-\gamma v(t-\tau)} \right\} \psi(\tau) d\tau, \quad (5)$$

where  $\varepsilon(y) = 1$  for  $y \leq 1$ ,  $\varepsilon(y) = 0$  for  $y > 1$ ;  $\delta > 0$  arbitrary small. The estimations (4), (5) are those mentioned above, they are used for the proof of the convergence of (7).

The final solution is formulated by the author in the following theorem:

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let

$$\sup_{t > 0} \|f(x, t)\|_{M(\Omega; \beta)} < \infty, \sup_{t, t' > 0} \max_{x \in \Omega} \frac{|f(x, t') - f(x, t)|}{|t - t'|^\beta} < \infty$$

$$\|\alpha(x)\|_{M(\Omega, \beta)} < \infty$$

for a certain  $\beta > 0$ . Then in a certain cylinder  $Q = (\Omega \times [0, T])$  there exists the classical solution of (6) (i.e. a solution, being continuous up to the boundary  $S$  and to the plane  $t = 0$  and possessing continuous derivatives in  $\Omega$  which enter in (6)).  $T$  is estimated from below by the quantities  $\sup_{t > 0} \|f(x, t)\|_{M(\Omega, \beta)}$  and  $\|\alpha(x)\|_{M(\Omega, \beta)}$ ;

if these are sufficient small then  $T = \infty$ .

Theorem: The "weak" solution of (6) possesses the derivatives  $u_{x_i x_j}$ ,  $u_t$ ,  $p_{x_i}$ , which are summable in power  $\frac{5}{4}$  on  $\Omega$ .

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Academy of Sciences USSR)

PRESENTED: April 28, 1961, by V. J. Smirnov, Academician

SUBMITTED: April 13, 1961

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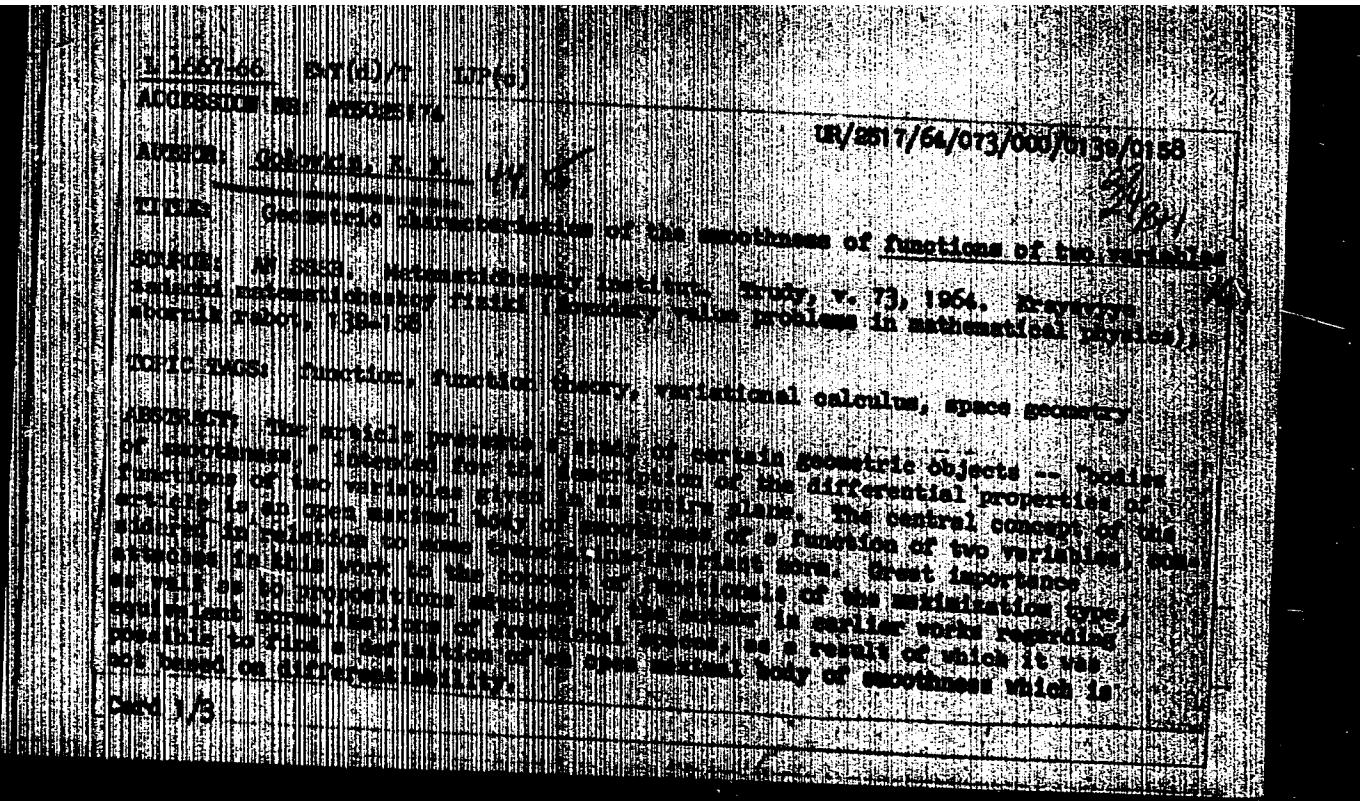
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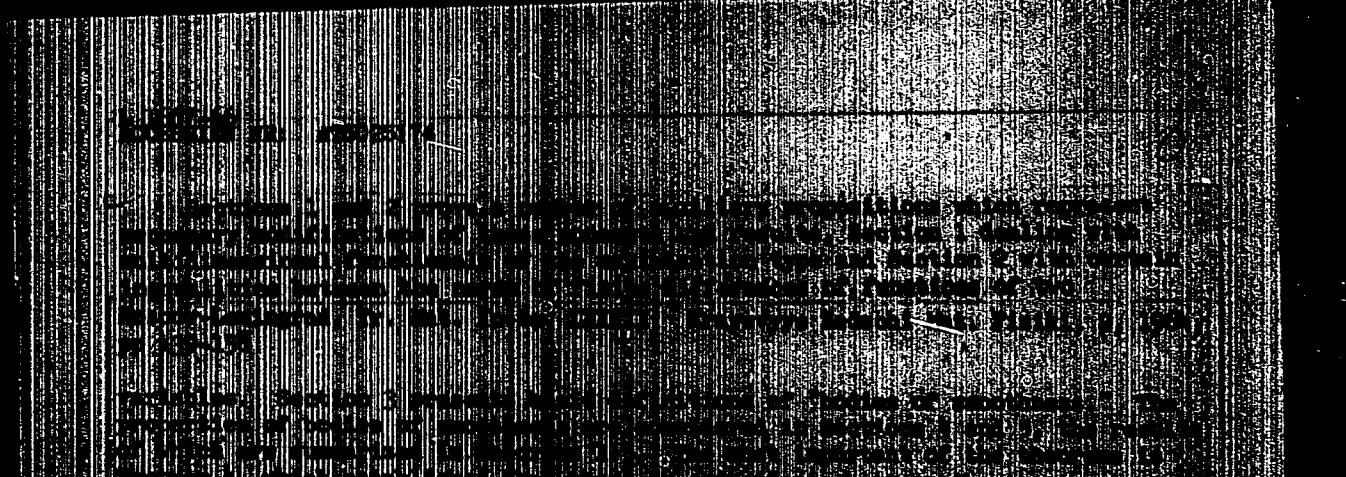
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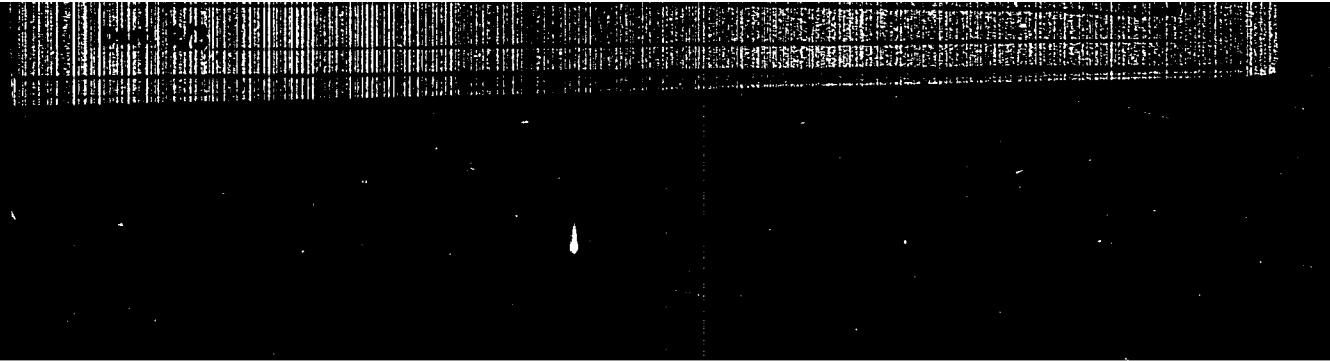


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ACC NR: AT701166

SOURCE CODE: UR/0000/66/000/000/0001/0008

AUTHOR: Genin, A. N.; Golovkin, L. G.

ORG: none

TITLE: Problem of prolonged autonomous exposure of a man to the conditions of a spacesuit

SOURCE: International Astronautical Congress. 17th, Madrid, 1966.  
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TOPIC TAGS: space suit, life support system, manned space flight,  
space suit ventilation

ABSTRACT:

At the present time, scientific research and design work are investigating various systems for thermal regulation of spacesuits. The basic problem in such systems is the removal of endogenic heat, which varies in dependence on the amount of work performed by the cosmonaut and between 90 and 500 kcal/hr. Radiant heat exchange between the spacesuit and the surrounding medium can be reduced to a minimum by vacuum type insulation. The majority of the systems under  
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ACC NR: AT7011645

development are based on utilization of the latent heat of evaporation of water. The present paper deals with maintenance of the heat balance of the cosmonaut within a spacesuit only by means of physiological perspiration alone. The most efficient method of losing endogenic heat directly utilizes evaporation of liquids from the surface of the skin or from the lungs. This system has certain disadvantages in that the possibility of creation of comfortable heat sensations and retention of normal structure of the heat balance is eliminated.

The first series of experiments, carried out in a thermal pressure chamber at more than 40°C, was designed to study the ability of the organism to compensate for external heat loading for periods of 2 to 10 hrs, both in a state of relative rest and during the performance of physical work. Subjects wore spacesuits ventilated by sufficient dry air to assure almost complete evaporation of all perspiration produced. In order to compensate for dehydration in experiments lasting more than 3 hrs, the subjects were permitted to drink an unlimited but strictly recorded amount of liquids. An absolute pressure of 354 to 267 mm Hg was maintained inside the spacesuit. Evaluation of the heat exchange condition of the subjects was based on temperature and

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on basic physiological functions (rectal temperature, skin temperature at 5 different points, temperature of the sub-spacesuit space, the heat produced as indicated by the pulmonary gas exchange, moisture loss, the effectiveness of evaporation of sweat, and pulse and respiration frequency). Seven subjects were used in 25 experiments.

A 2-hr exposure with an external heat load of 133 kcal/hr resulted in the onset of overheating. Body temperature rose by 0.3°, the heart rate increased somewhat; the total heat load (including endogenic heat) was 219 kcal/hr; and moisture loss was 357 g/hr. All of the perspiration produced evaporated completely. When the external heat load was reduced and the total heat load maintained at about the same level by increasing the physical workload, no overheating was observed, even during longer exposures. In the latter case, moisture loss was 398 g/hr. If the external heat load was reduced to 46 kcal/hr, the condition of the subject was significantly better. Moisture losses dropped to 210 g/hr and the subjects evaluated their own sensations as being warm. In this case the subjects remained in spacesuits for a period of 10 hr. During this period

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their general condition did not change except towards the very end, when general fatigue set in.

Results of these experiments agree with those found in the literature, which indicate that heat produced by muscular exertion is easier for humans to withstand than an external heat load. On the basis of these experiments it can be assumed that it is possible for man to remain in spacesuits for periods of 3 to 4 hrs and to dissipate 200-220 kcal/hr by evaporation of perspiration from the skin. This figure includes both endogenous and external heat load. If the external heat load is reduced, the time that man can withstand under these conditions increases considerably.

In a second series of experiments the ability of the organism to lose heat or to maintain thermal balance by sweat loss for periods of up to 7 days was investigated. Experiments were performed in a thermal pressure chamber to simulate actual heat conditions during flight and during spacecabin depressurization. For this experiment, 3 subjects were used, who were from 21 to 38 years of age and wore spacesuits in which an abso-

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lute pressure of 300 mm Hg was maintained. The residual pressure in the chamber was 5-6 mm Hg. The pressure within the chamber and within the spacesuits did not vary during the duration of the entire experiment. In the spacesuit, the temperature of the chamber walls and chamber atmosphere was maintained on a level which corresponded to the temperature of the gas mixture in the sub-spacesuit space. The subject, wearing a carefully fitted spacesuit, was placed into a special couch or armchair. This couch could be made to recline at any angle all the way to a horizontal surface. Life support was provided by a special laboratory system, to prevent the necessity of changing the pressure in either chamber or spacesuit. Food was supplied to inside the helmet of the spacesuit in liquid form. Unlimited water was available to the subject. The helmet was supplied with pure oxygen. The muscular activity of the subjects was limited to controlling life support systems and the performance of functional tests for investigation of the condition of the cardiovascular system. Two different types of spacesuit ventilation were used. In the first, the temperature of the air entering the suits was close to that of the skin surface,

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and all endogenous heat was removed by evaporation of sweat. In the second case, 25 to 40% of the heat was removed from the spacesuit by ventilating it with cooled air.

The thermal conditions of the subjects were studied by determining the following parameters: energy expenditure, moisture loss (other than kidney), body temperature under the tongue, skin temperature at 7 points, temperature of the air vented from the spacesuit, and the temperature and humidity of the air in the sub-spacesuit space. Thermal exchange in the subjects was calculated from these parameters. In addition, the authors investigated the dynamics of certain functional indices of the cardiovascular system, respiration, metabolic processes, and work capacity. The maximum duration of the experiment was 7 days 17 hrs. One of the experiments was cut short after 4 days due to a sharp deterioration in the condition of the subject, chiefly due to overheating of the organism and a weakening of the functional condition of the cardiovascular system.

The results obtained in these experiments indicate  
that various factors related to prolonged wearing of a  
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